

# Cooperative Competitiveness and Capital Structure in the Greek Dairy Industry

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## Abstract

There has been an increasing interest in cooperative capital structure and its association with the cooperative competitiveness, but the relevant hypotheses have not been tested by using a comprehensive analysis. This paper examines the effects of financial ratios on net profit margins using panel data for the period 1990-98<sup>1</sup> and explains differences between the cooperative and the investor owned firms (IOFs) operating in the Greek dairy industry. The relevant descriptive statistics show that IOFs are more profitable, while fixed effect results suggest that profitability differences between the two groups can be mainly attributed to the greater effectiveness of IOF capital structure determinants. These results provide a clear message to the cooperative management that if cooperatives' aim is to improve their competitiveness against IOFs, then Greek dairy cooperatives should increase the contribution of retained profits to capital along with a better exploitation of capital intensity and economies of scale. The paper, however, suggests that a study of non-economic aspects is also required for a complete evaluation of the Greek dairy cooperative performance.

## Introduction

One of the most complicated issues, which concern the financial management of both the cooperatives and the IOFs, is the relation between the capital structure of a firm

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<sup>1</sup> The reason of the absence of more recent data is the change of the country currency from drachmas to euro which could probably influence the results and lead to conclusions not representative of the structure of the dairy market in the 1990s.

and its ability to compete IOFs operated within the same market. What is the optimum value for a number of financial indices to achieve the best possible results in terms of competitiveness as it can be measured by profit margin? This problem is of particular concern for cooperatives since on the one hand profit maximization is not considered to be their primary aim, while on the other they come under enormous pressure from competition from the private sector to finance investments and expensive competitive strategies, given that the cooperatives offer the same products and they are exposed to the same market conditions with the IOFs (Bateman *et al.*, 1979; Oustapassidis, 1998).

It is well known that the financial structure of the cooperatives is impacted by the management system, fundamentally differing from that of IOFs (one man = one vote, instead of one share = one vote) with the ensuing consequences as regards the dividends and interest policies. However, it is vital for cooperatives to achieve the optimum capital structure in order to be in a position to fund both the necessary investments and strategies which will render them competitive (Helmberger and Hoos, 1962; Oustapassidis and Notta, 1997). Otherwise they will not be able to survive in the long run within markets where both competitive strategies and investment in new technology are intensively applied by the existing firms. Greek dairy manufacturing firms are forced to apply such expensive practices to increase their market power (Oustapassidis, 1998; Nielsen Hellas, 1990-98). The ability of firms to finance these strategies significantly affects the net profit margin and thus their competitiveness.

While the Industrial Economics literature includes a large number of empirical studies referring to the effects of structural (*e.g.*, market share) and organization variables on firm's performance (*e.g.*, Scherer and Ross, 1990; Hay and Morris, 1991; Martin, 1994; Vlachvei and Oustapassidis, 1998; Oustapassidis and Vlachvei, 1999) only few studies (*e.g.*, Martin, 1993) have examined the effects of financial ratios on profitability in the manufacturing sector. Further, the relevant cooperative literature includes some studies (*e.g.*, Price and Peters, 1983 and 1985; Parliament *et al.*, 1990) referring to the financial characteristics of agricultural cooperatives. However, the effects of financial variables on both the cooperative and the IOF profitability have not been examined by applying a comprehensive analysis. For the purpose of this paper panel data are used to estimate linear regression models by employing the fixed effects method. Comparison between the two sets of results is made. In addition, the study of the impact of financial indices on anticipated profits, both of cooperative and IOFs, in such a dynamic sector as that of the Greek dairy industry (Oustapassidis, 1998) is of particular interest. Subsequently, once we have arrived at certain conclusions as to the impact of the above-mentioned indices on net profits, we will propose policy measures to improve the economic development of agricultural dairy cooperatives in Greece.

The analysis will be supported by diagrams while the theoretical model will be put forward to test the effects of each of the financial ratios taken separately on profitability. Following comments on the results, policies will be proposed aiming at the

improvement of financial indices to ensure that their final impact will be effective. Following arguments against neoclassical studies examining only financial aspects of cooperative performance, we study other non-financial elements of dairy cooperative behavior in Greece.

### **Cooperative competitiveness and finance**

The structure of capital, and whether it is currently good, excellent or bad, will arise from the study and the effectiveness of basic financial indices, such as: the degree of coverage of fixed assets by equity capital, the capital intensity, the ratio of fixed to total assets and the degree of internal finance which all affect the cost of capital (Brigham and Gapenski, 1991; Fama, 1991; Martin, 1993 and 1994). Moreover, it is reasonable for someone to believe that only by creating undistributed profits, on the one hand, and exploiting certain privileges and advantages at their disposal on the other, cooperatives can fulfill the role they have taken, which depends on their ability to compete IOFs on the market. Cooperatives that successfully compete IOFs can increase their price cost margin and thus their profitability and their ability to invest in both sales promotion strategies and modern technology. The higher the proportion of undistributed profits to total cooperative profits, the cheaper the cost of capital used to finance investment required for development and cooperative competitiveness. This, of course, may not satisfy short run interests of the cooperative members who may prefer the distribution of all, or a great proportion, of cooperative surplus as dividends among them. If cooperative management applies a policy satisfying short term interests of the membership, then it will find it difficult to finance development programs by borrowing capital from the banks, which requires the payment of an extra cost for the interest.

Cooperatives were formed (Porter and Scully, 1987; Oustapassidis, 1988 and 1992) in response to problems in the market system for agricultural products. In order to combat the disadvantage at which they stood compared to the organized large businesses in the sector, the producers and various small enterprises formed these organizations. There are of course differences with respect to the aims of IOFs and cooperatives, a consequence of which are the different strategies used by each. Strong competition forces de facto the management of cooperatives to adopt the same strategies as the private sector. Whether or not profits are expected to be made from an economic activity, the need for constant modernization and investment in new technology, as well as the finance of expensive competitive strategies such as product differentiation, is imperative. The dairies of the sample do not differ in their technology since both cooperatives and IOFs have access to the same technology. Thus, they do not differ in their technology and production methods. The ability to finance investments is associated with the existence of retained profits and the level of equity capital. Given that cooperative principles do not favor the payment of a rate

of interest for the share capital, cooperatives suffer from a competitive disadvantage against IOFs, since these principles will cause difficulties in raising capital required to finance investments.

According to the cooperative literature (*e.g.*, van Bekkum and van Dijk, 1997) there seems to be a growing interest in creating new financial solutions challenging the traditional way of organizing a cooperative that has not succeeded in becoming sufficiently viable in competitive food industries. Such reorganizations that have taken place improve capital structure and enable cooperatives to finance huge investments also in intangible assets. In some countries (*e.g.*, Ireland, The Netherlands, Austria) some cooperatives were transformed into joint stock companies with both farmer-members and private investors constituting their shareholders. Other innovations in Europe and North America include the introduction of tradable shares.

### Specification of the profit model

Following the relevant Industrial Economics literature (Martin, 1993) the Lerner index of market power of firm  $i$  in the Cournot case is:

$$\frac{p-c}{p} = \frac{s_i}{e_{QP}} \quad (1)$$

where  $p$  is the market price,  $s_i$  the firm's market share,  $e_{QP}$  the price elasticity of demand and  $c$  is the total cost. Total cost is the cost of variable factors plus the normal rate of return on capital:

$$c_i(q_i) = wL_i + \rho K_i \quad (2)$$

where  $q_i$  is firm  $i$ 's output,  $w$  can be thought as a vector of input prices,  $L_i$  as a vector of input levels,  $\rho$  is the rate of return on capital unit and  $K_i$  is the value of firm  $i$ 's assets. Then with little manipulation equation (1) yields an expression for firm level price-average cost margin equation:

$$\begin{aligned} \frac{pq_i - cq_i}{pq_i} &= \frac{s_i}{e_{QP}} \Rightarrow \frac{pq_i - wL_i - \rho K_i}{pq_i} = \frac{s_i}{e_{QP}} \Rightarrow pq_i - wL_i - \rho K_i = \frac{s_i}{e_{QP}} pq_i \Rightarrow \\ \Rightarrow pq_i - wL_i &= \frac{s_i}{e_{QP}} pq_i + \rho K_i \Rightarrow \frac{pq_i - wL_i}{K_i} = \frac{s_i}{e_{QP}} \frac{pq_i}{K_i} + \frac{\rho K_i}{K_i} \Rightarrow \\ \frac{pq_i - wL_i - \rho K_i}{K_i} &= \frac{s_i}{e_{QP}} \frac{pq_i}{K_i} \end{aligned} \quad (3)$$

The left hand term is equal to the net profits to total assets ratio. The term on the right hand is equal to the market share  $s_i$  (the proportion of firm's sales to the total industry sales), the ratio of the firm's sales ( $p q_i$ ) over its total assets ( $K_i$ ) and the price elasticity of demand ( $e_{QP}$ ). Data for price elasticity of demand are not easily available but the empirical studies (Martin, 1993) usually use other variables to express the elasticity of demand. The elasticity of demand in a competitive market is mainly determined by competitive strategies such as advertising intensity, R&D, market channels and other strategies. Given that the above are expensive strategies depending on the availability of capital, it is reasonable to express the elasticity of demand as a function of the capital structure determinants.

So, we include in the model a number of financial indices describing the capital structure along with the two variables appeared in (3) (*e.g.*, Scherer and Ross, 1990; Martin, 1993 and 1994). Thus the specified empirical model is:

$$\text{NRT} = a_0 + a_1\text{MS} + a_2\text{KS} + a_3\text{NWFA} + a_4\text{FATA} + a_5\text{NPCP} \quad (4)$$

where:

- NRT is the annual profitability expressed as the ratio of net returns to assets;
- MS is the market share as the proportion of firm's sales to the total industry sales;
- KS is the ratio of total assets over sales;
- NWFA is the equity coverage of fixed assets index given by the ratio of net worth to fixed assets showing the ability of a firm to cover long run investment by its own capital;
- FATA is the ratio of fixed assets to total assets;
- NPCP is the internal finance index, that is the ratio of reserve capital (retained or undistributed profits) to the share capital showing the annual contribution of the retained profits to the capital formation.

Following the relevant literature (Martin, 1993; Shepherd, 1994; Lev, 1974; Chen *et al.*, 1985; Copeland, 1983; Parliament *et al.*, 1990) the following have to be noted with regard to the empirical model.

- a) It is expected that market share is a main determinant of firm market power and that higher market share will cause higher concentration, lower competition, lower cost due to economies of scale and higher profit margin ( $a_1 > 0$ );
- b) It is expected that the higher the ratio of total assets over sales, the higher the profitability, as the higher the capital intensity, the higher the ability of a firm to differentiate its product ( $a_2 > 0$ );
- c) If the ratio of equity capital to fixed assets is high, the firm can cover its long-term investment requirements from its own capital. Since this capability minimizes the risk of losing capital assets, its consequence is easier funding

to achieve a further increase in sales. Thus we expect the impact of this index on profitability to be positive ( $a_3 > 0$ );

- d) We would note that the higher the proportion of fixed assets to total assets, the greater will its negative impact be on the net profit of the enterprise, given that sales are likely to be low since the firm will be short of the necessary materials, stocks, etc., with an overall reduced level of activity due to the reduced level of current assets ( $a_4 < 0$ );
- e) Finally, the extent of internal finance is expected to have a positive impact especially if interest rates are high, as they have been in Greece, over the study period (Agricultural Bank of Greece, 1992-98) and thus the high cost of capital ( $a_5 > 0$ ). This can be explained by the fact that if the company has financial independence, the cost of the required capital will be less than in the case of firms depending on external finance. Firms using internal finance pay a low cost for the borrowed capital to boost their activities either through the purchase of materials and stocks or through increasing sales.

## Data and variables

Table 1 shows that the contribution of the agricultural sector to both GDP (7.5%) and total employment (20.8%) in Greece is greater than in the other European Union countries where the respective mean figures are 2.47 percent and 7.47 percent. These figures show that agriculture plays an important role in the Greek economy. The study of cooperative figures (total number, membership and turnover) clearly shows that although Greek agricultural cooperatives include a larger number of organizations than most other EU members, their turnover is smaller than the respective figures in these countries indicating that the role of cooperatives in agricultural marketing is rather limited. The last column of Table 1 shows that EU dairy sector is dominated by cooperatives. The relevant figures for cooperative market share, especially in the north EU countries, are very high (*e.g.*, 100 percent in Ireland, 99 percent in Finland, 98 percent in the UK). The respective figures for Italy (38%) and Spain (35%) are substantially lower than the above ones. Finally, Greek dairy cooperatives follow by having the lowest market share among the EU dairy co-ops. This indicates that these organizations face serious problems in terms of competition against IOFs within the Greek dairy market.

**Table 1: General statistics on agriculture and cooperatives in the EU**

Country	Agr./ GDP (%) ('94)	Agr./ Labor (%) ('94)	No. of co-ops	No. of mem- bership*	Turn- over of co-ops bill. ECU	Market shares of dairy agr. co-ops (%)
Belgium	1.6	2.5	not avail.	not avail.	not avail.	50
Denmark ('91)	2.5	5.7	214	113,000	12.1	93
Germany ('96)	0.8	3.0	3,950	3,280,000	39.3	58
Greece ('96)	7.5	20.8	6,919	782,000	0.85	20
Spain ('96)	2.7	9.8	4,350	950,000	6.3	35
France ('93)	2.0	4.8	3,618	720,000	52.6	49
Ireland ('95)	5.4	12.0	128	186,000	9.59	100
Italy ('95)	2.6	7.9	8,850	1,124,900	16.45	38
Luxembourg ('95)	0.9	2.8	25	(100%)	0.12	80
Netherlands ('96)	3.2	4.0	251	273,000	22.4	82
Austria ('96)	2.2	13.3	1,757	2,182,000	not avail.	90
Portugal ('96)	2.0	11.6	909	800,000	1.27	87
Finland ('95)	1.8**	8.3**	403	1,228,500	7.59	94
Sweden ('95)	1.0	3.4	50	300,000	8.24	99
UK ('95)	0.9	2.2	506	271,000	7.66	98
Average	2.47	7.47	167.69	872,172	13.17	71.46

\* include double countings

\*\* excl. forestry

Source: *van Bekkum & van Dijk, 1997, a study carried out by the Netherlands Institute for Cooperative Entrepreneurship (NICE) at the request of COGECA and co-sponsored by the European Commission, DG XXIII.*  
(Calculations have been made by the authors).

It is important to note that the dairy cooperatives of the sample, including all large dairy manufacturing co-ops in Greece, not only had a rather small market share at the beginning of the period but also their aggregate share declined from 20.50 percent to 18.00 percent between 1990 and 1998 (ICAP Hellas, 1990-98). These figures indicate a loss of cooperative competitiveness against their IOFs competitors.

The study uses panel data for the 31 largest firms covering a period of nine years (1990-98). This period is sufficient to give a reliable evaluation of the factors influencing profit. The data also allow us to study the differences between IOFs and cooperatives and the impact of the same variables on net profit. To study this effect on the profit ratio, we collected data from both the balance sheets and the income statements of the large dairy companies in Greece for the study period. It is important to note that all Greek firms are obliged to publish their annual balance sheets and income statements which are available on an annual basis by a proprietary service company called ICAP. So, the data were taken from the ICAP database (ICAP, 1990-

98). The sample includes cooperative and IOFs comprising 90 percent of total turnover in the sector (the rest is covered by a large number of small local firms). Twenty-six of the companies are IOFs and the rest cooperatives. The authors calculated the profit ratios, structural variables and financial indices used.

Following the relevant financial economics and accounting literature (*e.g.*, Kim, 1978; Haugen and Senbet, 1978; Parliament *et al.*, 1990) we calculate and study the mean values of the annual financial indices, which are expected to affect profitability, for the full sample and the two groups (cooperatives and IOFs). The ratio of net worth to fixed assets gives the index of coverage of fixed assets by equity capital. When that index is greater than one, the firm funds long-term investments through equity capital, minimizing the risk of losing its property assets (through bankruptcy). The ratio of fixed to total assets shows the proportion of available assets in fixed and in current assets. This index has to be below 1 since it would not be reasonable for a firm to invest its capital only in fixed assets nor in fixed assets in greater proportion than its current assets for, as it is known, income is generated by current elements only. Finally the ratio of reserve capital formed by the retained profits to share capital shows the extent of autonomous internal finance. The higher this figure, the greater the extent to which undistributed profits is made available to finance the firm's activity.

Table 2 shows the mean values of all variables included in the models for each of the categories of firms and overall for the sample used. The indices for profitability show that IOFs are more profitable than cooperatives. The sign for the co-ops is negative indicating that some of them are unprofitable. The value for the total assets to sales ratio (0.83) for cooperatives show a lower capital intensity for leaving room for a further increase of this ratio to approach the value (0.87) that corresponds to IOFs. The index of coverage of fixed assets by equity capital in the private sector indicates that these companies have a greater capability to finance long-term investments compared to the cooperatives, which on average give negative values for this index (-0.35). The fixed to total assets ratio for both IOFs and cooperative dairies can be seen to be favorable since it is less than 1 (0.46 and 0.35, respectively). The value of the internal finance index (1.03) for this period for the investor owned dairies is much more favorable due to the reasons outlined above, while in contrast, for the cooperatives it is negative (-3.82).



**Table\* 2: Mean values of variables by group, 1990-98**

Variables	Definition	All	IOFs	Co-ops
NRT	$\frac{\text{Net profits}}{\text{Total assets}}$	0.04	0.05	-0.01
Market share	$\frac{\text{Firm sales}}{\text{Industry sales}}$	3.54%	3.52%	3.65%
KS	$\frac{\text{Total assets}}{\text{Sales}}$	0.86	0.87	0.84
NWFA	$\frac{\text{Net worth}}{\text{Fixed assets}}$	1.18	1.49	-0.35
FATA	$\frac{\text{Fixed assets}}{\text{Total assets}}$	0.45	0.46	0.35
NPCP	$\frac{\text{Reserve capital}}{\text{Capital}}$	0.21	1.03	-3.82

Source: *ICAP HELLAS, 1990-98*.

(Annual Balance Sheet Data of the Greek Manufacturing Companies).

## Results

Table 3 shows the results of the Fixed Effect (FE) method<sup>2</sup>. The method provides a dynamic evaluation of the effects of the financial variables included in the model of the profitability changes and it is able to isolate the particularities of certain companies (Judge *et al.*, 1988). The value of  $R^2$  for the full model shows that a great proportion (59%) of the profitability changes of both IOFs and cooperatives in the dairy sector can be mainly explained by the three (KS, NWFA and NPCP) financial indices and the structural (MS) variable included in the model. Further, the results show that the three variables (the capital intensity, the equity coverage to fixed assets and the internal finance index) have all the expected positive and statistically significant effect on profitability. As we expected the effect of market share is positive and significant while the coefficient of the ratio of the fixed to total assets is insignificant.

<sup>2</sup> The estimation of the Fixed Effect method was made by the use of the programme "LIMDEP, 1996".

**Table 3: Fixed effects estimates of profitability by sample, 1990-98**  
(t-values in parentheses)

Variables \ Sample	All	IOFs	Co-ops
	FE	FE	FE
MS (Market share)	1.060 (2.49)*	1.080 (2.97)	2.495 (0.64)
KS <u>Total assets</u> Sales	0.021 (2.68)*	0.020 (2.88)*	0.092 (0.56)
NWFA <u>Net worth</u> Fixed assets	0.010 (2.89)*	0.006 (1.99)*	0.050 (2.03)*
FATA <u>Fixed assets</u> Total assets	0.023 (0.36)	0.100 (1.62)	-0.292 (-1.10)
NPCP <u>Reserve capital</u> Capital	0.002 (4.22)*	0.010 (1.90)*	0.001 (0.78)
R <sup>2</sup>	0.58	0.67	0.45
Number of observations <sup>a</sup>	279	234	45 <sup>b</sup>

\* Denotes statistical significant results at 5% (or less) level of significance.

a: There are 31 annual observations with no complete data for all variables.

b: The size of this sample is rather small but the model for cooperatives is estimated just for comparison with the IOFs.

The second model simply explains profitability differences among the IOFs. One can see that the market share, capital intensity, net worth to fixed assets and reserves to capital ratios are statistically significant with a positive impact, showing that the larger these indices are, the greater the level of profitability is among the IOFs.

The third model gives the estimates for the cooperative dairy companies in the sample. The results for the cooperatives show that only one variable (net worth to fixed assets) has the expected positive and significant effect on net profits and explains profitability differences among the co-ops. The coefficient of the net worth over fixed assets index is positive and significant. This result shows that cooperatives financing their fixed assets formation by their own funds (capital and reserves) are more profitable than other cooperatives depending more on borrowed capital.

These results are consistent with the results of a previous article published on this journal and referred to Greek dairy industry for the period 1990-94 (Oustapassidis and Notta, 1997). According to the results of that paper, the survival of cooperatives, especially in differentiated food manufacturing industries, heavily depends on their ability to finance expensive competitive strategies such as advertising and diversification, from their retained profits. If cooperatives' objective is to improve their performance in the dairy market, they must finance expensive competitive strategies mainly by internal sources of capital.

### Non financial aspects of cooperative performance

It is known that cooperatives and IOFs are generally viewed as different types (*e.g.*, Helmberger and Hoos, 1962; Parliament *et al.*, 1990) of firms since cooperatives cannot be characterized as profit maximizing organizations. This has a number of implications in terms of the management and performance of cooperatives and their ability to provide public goods and services to both their members and the society, which cannot be captured by a financial analysis. It is, therefore, worth noting that a complete evaluation of the cooperative performance requires a more general analysis that should also include non-financial aspects of cooperative behavior.

The non-profit cooperatives – especially the competitive ones – promote competition and bring efficiency in the markets where they operate. Nourse (1922) suggested that one of the roles cooperatives play is that of competitive yardstick. Similarly, Staatz (1987) notes that farmers may form a cooperative to force the IOFs, through competition, to improve their services to farmers and to generate benefits to all farmers in the area of the cooperative. Cooperatives also provide services like educational programs, insurance for farm products, generic advertising aiming to promote demand in agricultural products and representing farmer interests in state and EU organizations. The non-profit maximizing operation of cooperatives increases production of both agricultural inputs and food products which, in turn, may result in solving employment problems in rural areas.

Studies based only on an economic approach often argued against government policy promoting the emergence of inefficient cooperatives through subsidization programs given that such a policy may prevent the development of more efficient IOF's in the market (Porter and Scully, 1987). However, these conclusions have to be modified if there is evidence of monopsony power in the industry. Data for the market share of the leading Greek dairy companies<sup>3</sup> provide evidence of the presence of economies of scale, which suggests the potential for monopsony power. To the extent that the Greek dairy milk-processing industry lends itself to monopsony, the presence of cooperatives might be viewed as limiting the monopsonistic exploitation by IOF's.

<sup>3</sup> The market shares of the largest dairy firms in 1998 are as follows: Fage (IOF) 22%, Delta (IOF) 22%, Mevgal (IOF) 9%, Agno (Co-op) 7%, Dodoni (Co-op) 7% and Nestle (IOF) 6%.

In this sense the existence of efficient or even of a few inefficient cooperatives promotes the efficient behavior of proprietary firms. Also, the existence of monopsonistic milk processors might raise the transaction cost of milk processing. To the extent that vertical integration through cooperatives lowers this cost, cooperatives enjoy an advantage that offsets some of the disadvantages suggested by the above financial and econometric analysis. The benefits, however, that are associated with the presence of dairy cooperatives and increase general market efficiency and social welfare, cannot be captured only by the financial analysis. The latter refers to the producer (firm) surplus and ignores elements of farmer and consumer surplus. For example if the presence of a dairy cooperative that is less profitable than an IOF, through the promotion of competition, increases farmer income more than the respective decrease in its profitability, then its presence in the market will be beneficial, given that its net effect on the social (*e.g.*, farmers, consumers) welfare is positive.

The debate over cooperative facing competitiveness includes increasingly meta-economic considerations and arguments against conversions of agricultural cooperative organizations to investment oriented forms. Gray and Mooney (1988) criticized neo-classical economic studies suggesting the transformation of cooperatives to more efficient type of firms by applying strategies such as internal re-structuring, sell-outs and hybridization of cooperatives. The main interest of these organizations would no longer be based on member-use but on much narrower financial issues. According to the authors, neo-classical economics analyses do not allow the scientist to see historical and sociological aspects of cooperatives and broader implications of conversions. Although the authors recognize the importance of the financial studies, they argue for broadening the scope of the relevant analysis by including non economic aspects, mainly social and community, and for a more complete expression of the practical implications of the conversion of agricultural cooperatives.

Given the difficulties associated with the evaluation of performance on cooperative specific objectives non captured by financial analysis, this work follows other similar studies (*e.g.*, Boynton and Babb, 1982) and reports rather qualitative information from a survey conducted in 1999 among managers of the two (DODONI and AGNO) largest cooperatives of the sample. The managers reported the following advantages as perceived by cooperative members:

1. Members receive dividends that especially in periods of profitable activities increase substantially the final farmer price;
2. Cooperatives supply their members with animal foodstuffs characterized by high quality standards at low price;
3. Cooperatives provide technical services in areas of production and management aiming to improve quality and quantity of milk production;
4. Small and isolated producers are served by their organizations while IOFs avoid serving small farmers even if their production meets high quality standards;
5. Cooperative members enjoy better terms of payment (*e.g.*, no delay).

## Conclusions and proposals

The study uses panel data for the 31 largest dairy manufacturing firms in Greece for the period 1990-1998 to examine the effects of financial factors on annual profit margins of all the firms in the industry and separately for the IOFs and the cooperatives. A comprehensive panel data analysis (fixed effects) was applied to examine the relationships between net profitability and financial ratios.

It was found that the degree to which equity capital covers fixed assets, the degree of self-finance, the capital to sales ratio along with the market share, are positively associated with profitability of all the dairy firms irrespective of their form of ownership. The study showed that cooperatives are less profitable than IOFs and that the effects of financial variables on profitability significantly differ between the two groups of firms. These results along the mean values of the relevant variables suggest that cooperatives must alter their capital structure to have financial indices similar to those of the IOFs. According to the obtained results the improvement of the cooperative financial variables is expected to improve cooperative performance.

Based on the results we propose that the cooperatives take a number of measures such as:

- increase their share capital which should derive in part from a partial retention of the distributable annual profit;
- increase the reserve fund beyond that set by the articles of association in order to improve the extent of self-finance;
- new and state-of-the-art investments in production should be planned. Such investment will reduce production cost due to the introduction of new technology;
- although there are important differences between cooperative and IOF management, cooperative dairies should improve their financial management in order to increase their sales and thus the income of their members.

This article does not suggest that the evaluation of Greek dairy cooperative performance should consider only financial determinants; it recommends that other broader aspects referring to both society and community values should be also examined along with the financial analysis for a complete assessment of the cooperative competitiveness.

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